

METHOD FOR COOLING A MOTOR IN A BLOWER ASSEMBLY FOR A FURNANCE

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT WILLIAM S. GATLEY, citizen of the United States of America and resident of Cassville, County of County, State of Missouri and, Fasco Motor Group, the assignee, a corporation of the United States of America and a corporation of Missouri, County of County, State of Missouri, has invented certain new and useful improvements entitled as set forth above of which the following is a specification:

ANTHONY M. LORUSSO, ESQ.
Reg. No. 25059
Lorusso & Loud
440 Commercial Street
Boston, MA 02109
TEL: (617) 227-0700
FAX: (617) 723-4609

000290" 84446550

1 STATEMENT OF GOVERNMENT INTEREST

2 Not Applicable.

3
4 CROSS-REFERENCE TO RELATED APPLICATIONS

5 A claim of benefit is made to U.S. Provision Application
6 Serial No. 60/140,144 filed June 21, 1999, the contents of which
7 are incorporated herein by reference. This application is a
8 continuation of the provisional application Serial No.
9 60/140,144 entitled, ``80+ Blower and Furnace Venting Method''
10 and filed June 21, 1999, the teachings of which are incorporated
11 herein by reference.

12
13
14 BACKGROUND OF THE INVENTION

15
16 (1) Field of the Invention

17 This invention relates generally to a method for cooling a
18 motor in a blower assembly for a furnace. More particularly,
19 the present invention relates to a method of cooling an electric
20 motor without an auxiliary fan in a blower assembly.

21
22 (2) Description of Related Art

23
24 Typically, many gas-furnaces use induced draft blower
25 assemblies to control flue gas by removing the burnt by-
26 products. These blowers are designed to produce a certain
27 amount of airflow. The motor's shaft extends radially into the

1 blower's housing where an impeller is attached to the motor
2 shaft. The blower housing typically has one inlet and one
3 outlet. Combustion gases are drawn into the housing by the
4 rotating impeller that expels the gases through the outlet into
5 a flue or similar avenue of exit.

6
7 With respect to motor cooling, the gases that are forcibly
8 moved through the housing by the impeller do not come into
9 contact with the motor. Thus, blower activity does not in any
10 way contribute to the cooling of the motor.

11
12 As is known in the state of the art for conventional motor
13 and furnace assemblies, auxiliary fans are provided on the
14 rotating shaft of a blower motor to draw air into the motor
15 housing to cool the motor. The furnace electronics are located
16 in the vestibule area of the motor casing where the air
17 temperature can often reach 150°. The inevitable exposure of the
18 electronics to the vestibule heat shortens the working life of
19 the electronics. Typically vents are provided in the motor
20 housing to allow for the entry and exit of cooling air.

21
22 There are three notable drawbacks associated with the
23 presence and operation of fans in a blower motor assembly.
24 First, the fan inevitably creates drag on the operating motor
25 and reduces motor efficiency with respect to the task of drawing
26 in and expelling exhaust gases from an operating furnace.
27 Second, the fan inevitably generates unwanted noise. Third, the

1 presence of one or more fans increases the overall length of the
2 blower motor assembly. In an effort to solve these numerous
3 related problems, a method for venting the air in a furnace or
4 blower housing assembly has now been achieved that optimizes the
5 intake of combustion air and the expulsion of exhaust gases
6 while providing a ``cool-to-the-touch'' blower housing.

7
8 It is an object of the present invention to provide a
9 method for cooling the motor that eliminates the need for an
10 auxiliary fan. Another object of the invention is to reduce
11 noise levels produced by a blower by eliminating the auxiliary
12 fan. A further object of the invention is to reduce overall
13 blower motor height to allow for more streamlined furnaces. A
14 yet further object of the invention is to provide a means of
15 eliminating heat sources near the electronics in the vestibule
16 portion of a furnace to which the blower is attached. These and
17 other objects are accomplished from the following described
18 blower.

19 20 Summary of the Invention

21
22 This invention relates to a method of cooling a motor in a
23 blower assembly that thereby eliminates the need to have an
24 auxiliary fan to cool the motor.

25
26 According to the invention the assembly blower or motor
27 casing has at least one hole or aperture located anywhere on the

1 motor case to allow for the flow of air into the motor case.
2 The combination of the aperture on the motor case and impeller
3 back plate aperture allows for external air to be drawn into the
4 blower over the motor and into the impeller portion of the
5 blower housing and out an exhaust port situated in the blower
6 housing.

7
8 The new method eliminates the need for an auxiliary fan to
9 cool the motor, thereby, reducing the overall length of the
10 assembly. This method not only provides a motor case that is
11 self cooling but also provides the additional benefit of being
12 cool to the touch. Finally, this method provides for the
13 reduction of noise by the elimination of the fan.

14
15 These and other objects and features of the present
16 invention will be apparent from a review of the drawings and a
17 reading of the following detailed description of the invention.
18

19 Brief Description of the Drawings

20
21 FIG. 1 is a perspective view of a traditional blower
22 assembly with a motor housing according to one embodiment of the
23 invention.

24
25 FIG. 2 is an end view of a motor housing 10 as shown in
26 FIG. 1.
27

1 ^{Sub A1} FIG. 3 is a perspective view of a motor housing 10 as shown
2 in FIG. 1.

3
4
5 Detailed Description of the Invention

6
7 Referring to FIGS. 1-3, a method for cooling a motor in a
8 blower housing assembly for furnaces according to one embodiment
9 of the invention is shown. A motor cover or housing 10 is
10 configured to encompass a motor 12 which comprises a shaft 14,
11 rotor 16 and stator 18. Motor cover 10 has portions that define
12 a shaft bushing 20 and mechanical fastener bores 22 for securing
13 motor 12 to motor cover 10. Motor cover 10 has flanges 24 each
14 of which has portions defining a fastener bore 26 for securing
15 motor cover 10 to a impeller housing 28 which is configured to
16 encompass an impeller 30 which is attached to shaft 14.
17 Impeller 30 is situated in impeller housing 28 such that
18 impeller 30 can freely rotate within said impeller housing 28.

19
20 Motor cover 10 has at least one hole or aperture 32 located
21 anywhere on motor cover 10 for drawing in air to cool the
22 bearings (not shown) of the motor 12 in the motor cover 10. In
23 an alternate embodiment, vent aperture 32 can be formed as a
24 plurality of vent slots in other shapes (not shown) or as a
25 combination of apertures.

26
27 ^{Sub A2} Impeller 30 has a plurality of fins 34 which provide

surfaces for directing incoming air from motor chamber 38 or
exhaust gases from an attached furnace. The incoming air from
the motor 12 flows through at least one any size hole or
aperture 36 located on the back plate 42 of the impeller housing
28 from the motor case 10 by the impeller 30.

The method for venting the air in furnaces according to the
foregoing description results in a blower design that eliminates
the need for an auxiliary fan (not shown) attached to shaft 14.
In this method there is at least one hole or aperture 32
situated anywhere in a motor case or housing 10 that allows for
air to enter the housing 10 to cool the bearings (not shown) of
the motor 12 and the motor 12 itself in the motor case 10. The
warm air flows across and around the motor 12 in the direction
of the impeller housing 28 and through at least one any size
hole or aperture 36 located on the back plate 42 of an impeller
housing 28 from the motor case 10 by the impeller 30. An outlet
or exhaust pipe 38

Elimination of an auxiliary fan allows for the reduction
in the overall height for the blower housing. This, in turn,
allows for a similar reduction in height of a furnace. Coupled
with this beneficial effect is the elimination of some of the
noise that is inevitably produced by the blower via fan
operation. Also maximized is the elimination of the heat source
near the furnace electronics that are at least partially
contained in the furnace vestibule.

Sub
A3

It is further possible to eliminate much of the heat that is generated in the vestibule of a furnace. Temperatures which typically reach 150°F can be reduced to 90°F by using the novel venting method. The blower can be sealed off to the furnace for fresh air intake. Optionally, the blower can be sealed off to the furnace door to allow for the total sealing of the inducer compartment to maximize blower efficiency. Such a configuration maximizes the drawing of motor heat into the impeller chamber and out an outlet pipe 38 which is in fluid communication with the impeller housing 28. Also maximized is the elimination of the heat source near the furnace electronics which are at least partially contained in the furnace vestibule.

Numerous alternatives and embodiments exist for the invention such as modifications of the motor housing geometric configuration, integral versus modular motor cover and impeller housing, single large vent aperture versus a plurality of vent slots in the motor cover.

It is to be understood that the present invention is by no means limited to the particular constructions herein disclosed and/or shown in the drawings, but also comprises any modifications or equivalents within the scope of the claims.

1 Having thus described my invention, what I claim as new and
2 desire to secure by United States Letters Patent is:

3
4 1. A method of cooling the bearings of a furnace motor that
5 drives an impeller comprising:

6
7 rotating the impeller to draw air through a vent in a motor
8 housing whereby the air flows around the motor
9 situated within the motor housing into the direction
10 of an impeller housing to cool the motor bearings
11 thereby eliminating the need of a separate auxiliary
12 fan;

13
14 drawing air from the motor housing through a hole or
15 aperture situated anywhere in the impeller back plate;

16
17 removing air from the impeller housing via an exhaust port
18 situated in the impeller housing.

19
20
21 2. A furnace motor comprising:

22
23 a motor in a housing;

24
25 a vent in the housing to allow air to flow over the motor;

26
27 an impeller connected to the motor by a motor shaft, said

ADD
P-1

10